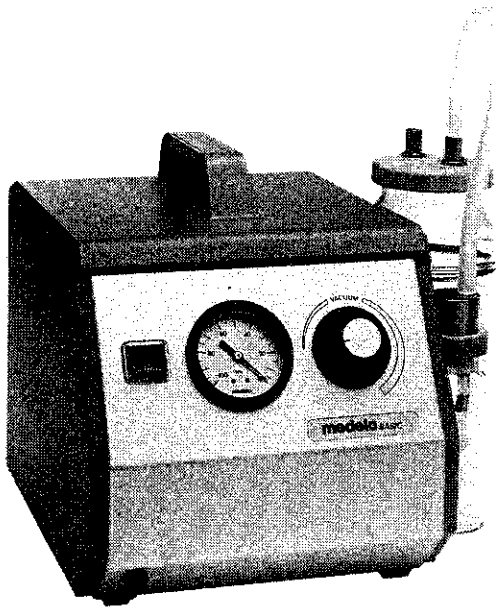
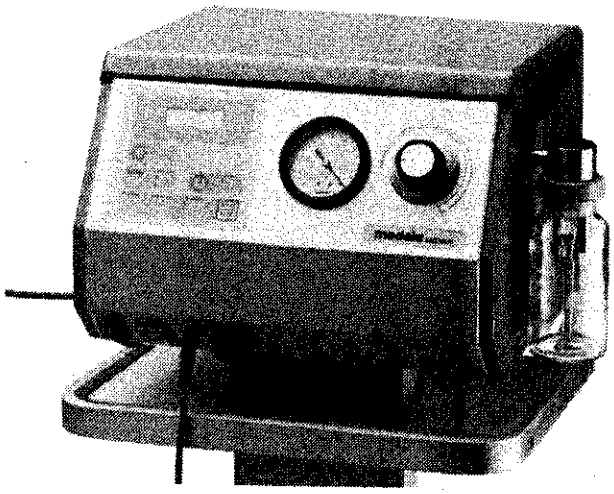
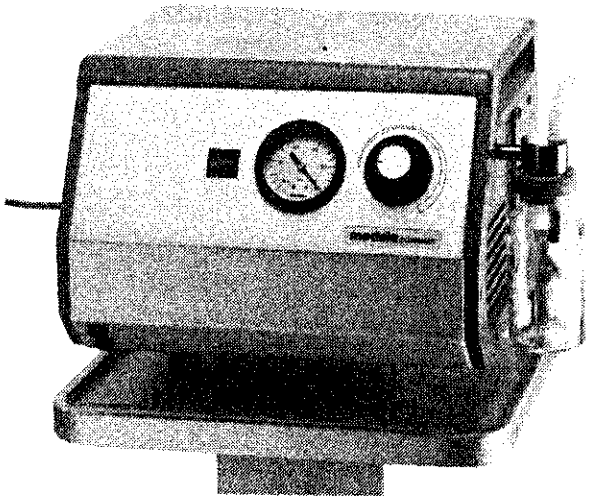
Service Instructions

Order Nr. 190.0101b

BASIC 036
MEDIAN 046
DOMINANT 056





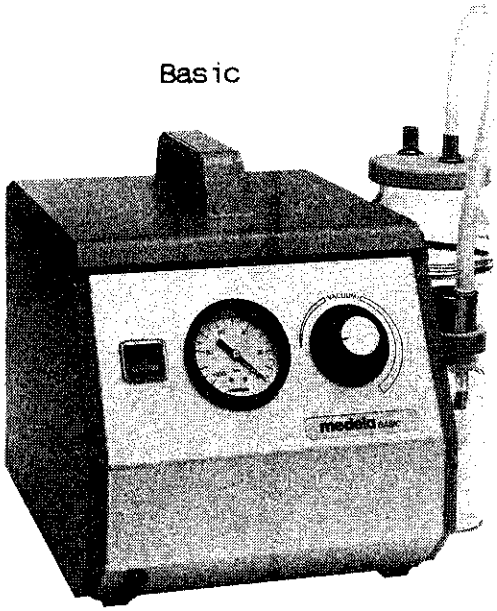


medela

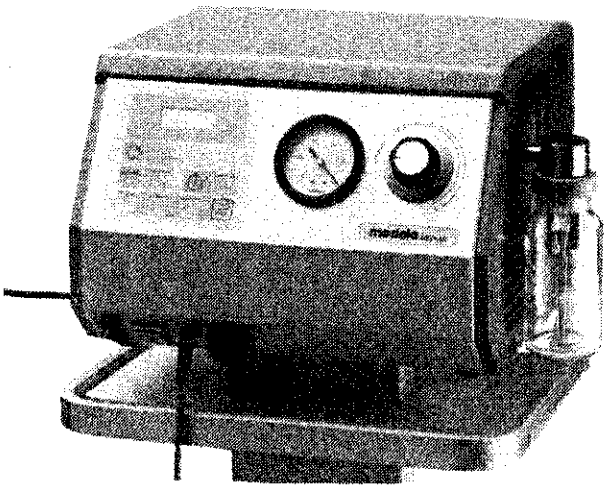
Table of Contents

		Page
1.	Technical Data	3
2.	Construction	4
3.	Pneumatic Diagram	5
4.	Electric Circuit Diagrams	6 - 8
5.	Trubleshooting	9
6.	Maintenance Procedures	10 - 13
	Servicing	10
	Dismatling and Cleaning Piston/Cylinder Unit	11
	Reassembly Piston/Cylinder Unit	11
	Replacement Flat- and Toothed Belts	11
	Service Call Indicator	12
	Correcting an Electronic Fault	13
7.	Spare Parts	14 - 19
	Drawings	14
	Spare Parts List / Order Numbers	17

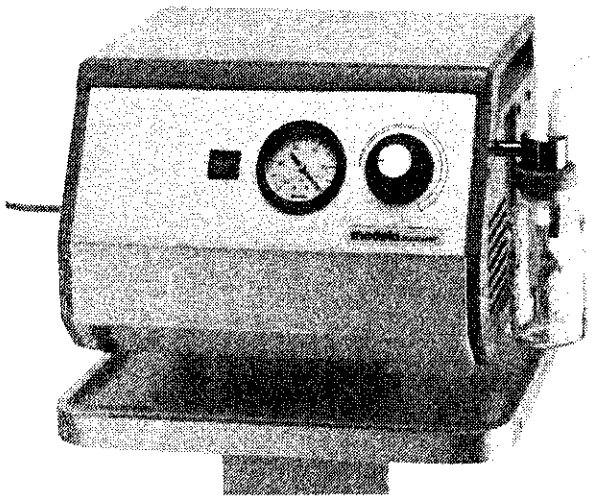
Basic



Median



Dominant



1. Technical Data

Power Supply	Standard : 220 V / 50 Hz Options : see sales literature		
Electric Standard	IEC 601.1 / Protection Class I or II		
Power Consumption	100 W	100 W	125 W
Vacuum Range * and Displacement:			
Secretion Aspirator and Surgical Suction Pump	5 - 90 kPa 20 l / Min	5 - 90 kPa 30 l / Min	5 - 90 kPa 45 l / Min
Vacuum Extractor	----------	see above	----------
Uterin Aspirator	----------	see above	----------
Low Vacuum Aspirator	10-80 mbar 20 l / Min	10-80 mbar 20 l / Min	----------
Hight + / - Stand Width " Depth " Weight "	267/984 mm 240/420 mm 324/480 mm 8,4/20 kg	227/944 mm 325/494 mm 324/616 mm 10/21 kg	227/944 mm 325/494 mm 324/616 mm 10/21 kg
	Basic 036	Median 046	Dominant 056

* These figures are based on the altitude of our production facilities in Baar/Ch, 444 meters above sea-level. According to local conditions resp. barometric pressure, slight deviations in measurements may be noted. The table below contains several factors as reference values. The vacuum figures given must be multiplied by one of these factors, according to the altitude of the location where measurements are caried out.

Location and vacuum reading

Location	sea-level	444m a.sl.	1000m a.sl.	2000m a.sl.	4000m a.sl.
Factor	1.06	1.0	0.94	0.83	0.64

2. Construction

Medela suction pumps operate on the tried and tested piston/cylinder system. The entire unit is designed to be simple and robust in construction.

Two double-acting cylinders powered by a single-phase asynchronous motor with integral belt drive produce high suction rates. The pump system operates at a low shaft speed. This means that noise and vibrations - as well as mechanical wear and tear - are kept to a minimum.

The cylinders pivot on teflon-coated sleeve bearings, which require no further lubrication. The sealed ball bearings fitted to the piston rods are permanently lubricated. The use of carefully-selected materials means that the piston/cylinder units require no lubrication; the pistons work dry, with almost complete freedom from wear.

The valves are grouped in a block which is easy to dismantle. This greatly facilitates cleaning operations.

The specially-designed vacuum regulator (patent pending) permits the pump to work up to the preselected level without by-pass, i.e. with full performance. This means that the desired suction level is reached very quickly. The range of adjustment covered by the vacuum regulator is linear. The evacuated air is allowed to escape via a sound absorber.

The whole low-voltage section of models fitted with electronics is mounted on a printed circuit board.

The components described above are all easily accessible. When carrying out maintenance work, it is only necessary to remove the four screws on each side and the outer casing can then be removed. The pump unit and controls are now free for access.

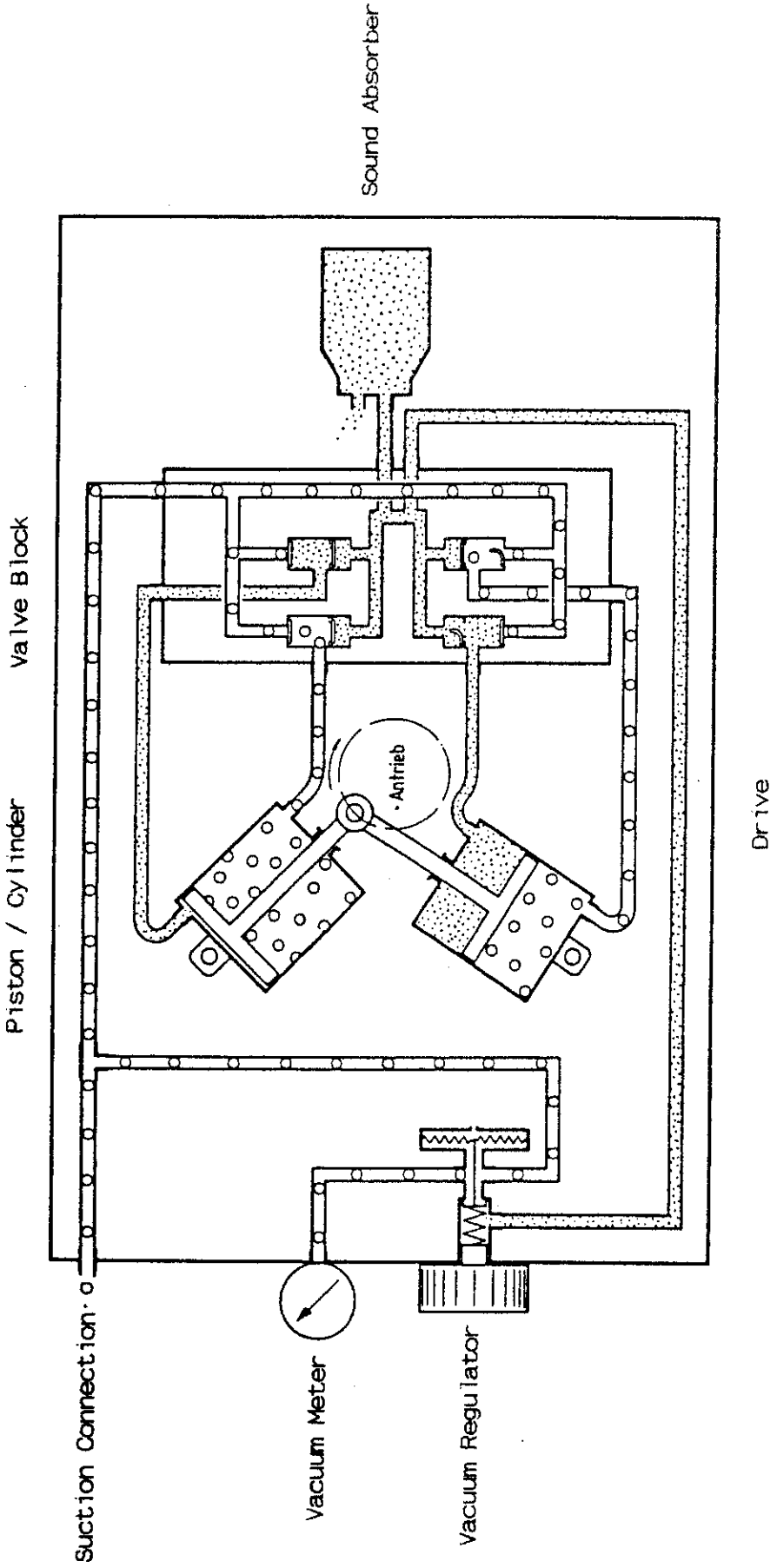
The clear layout of the operating and monitoring elements ensures simple, foolproof operation.

The mobile stand is fitted with four, pivoting castors. Two of these are fitted with brakes. A rail to which bottle-holders and other accessories can be attached is fitted at working height.

The safety bottle with lid is directly attached to the suction connection of the suction pump as a complete unit. The purpose of this vessel is to intercept droplets of liquid carried by air suction from the secretion bottle, thereby protecting the suction pump unit from contamination. For reasons of hygiene, however, it is vital to use a bacteria filter at all times in order to filter the evacuated air before it enters the pump.

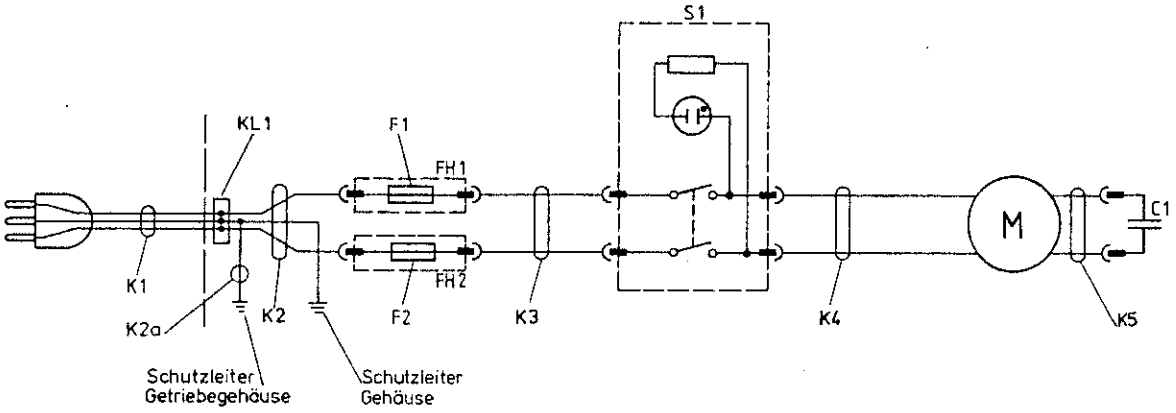
The secretion bottles are equipped with practical quick-locking lids, which can be fitted to all sizes of bottle. An overflow protection device (float valve) is a standard fitting. This prevents fluid from entering the pump, whenever the secretion bottles have inadvertantly not been emptied in time. If necessary (e.g. for cleaning purposes) the float valve can easily be removed. The use of standardized tube connectors means that bottles are easy to link together.

3. Pneumatic Diagram

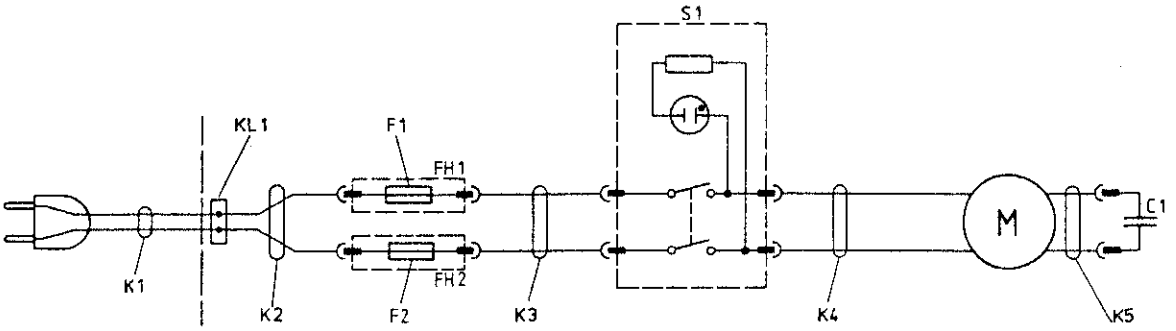


4. Electric circuit diagrams

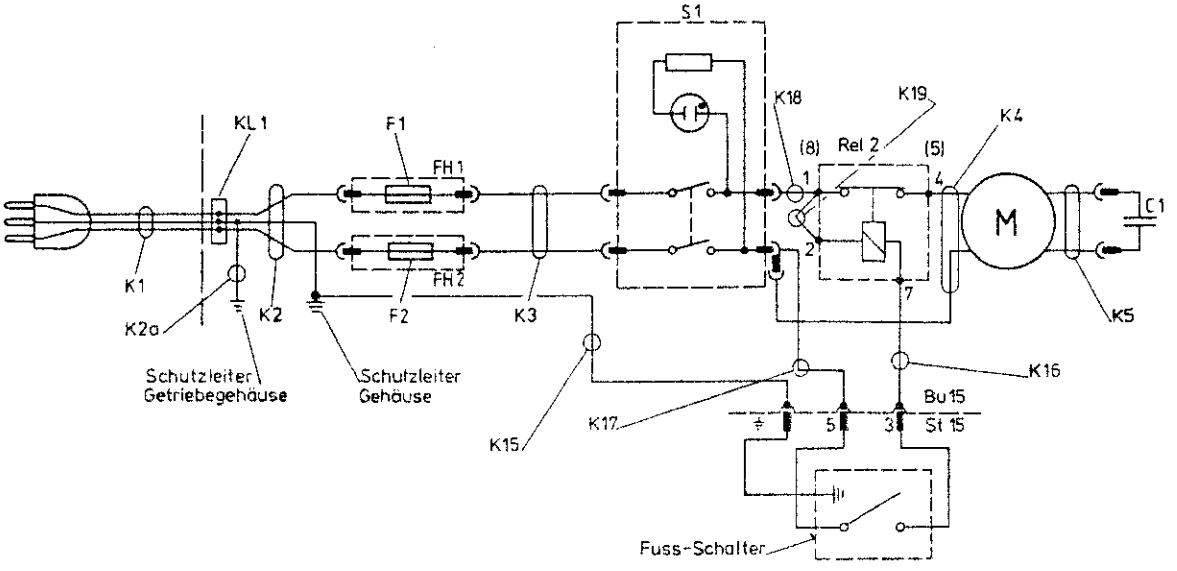
A. Without electronics



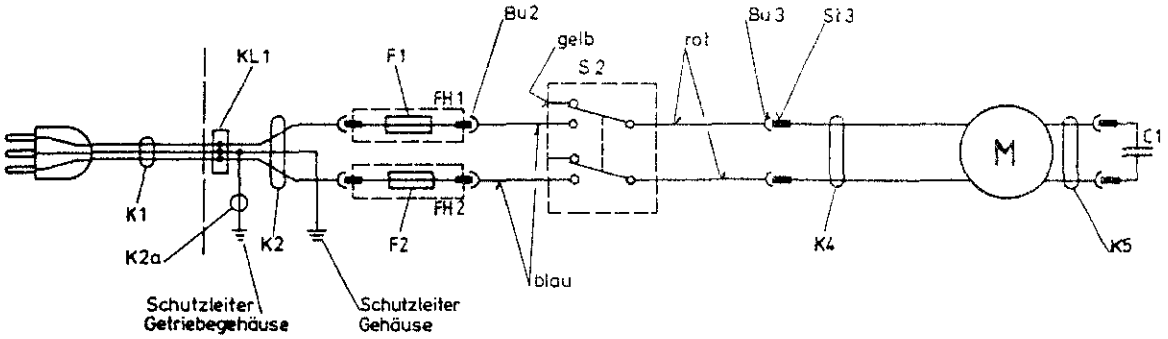
B. Without electronics Protection Class II



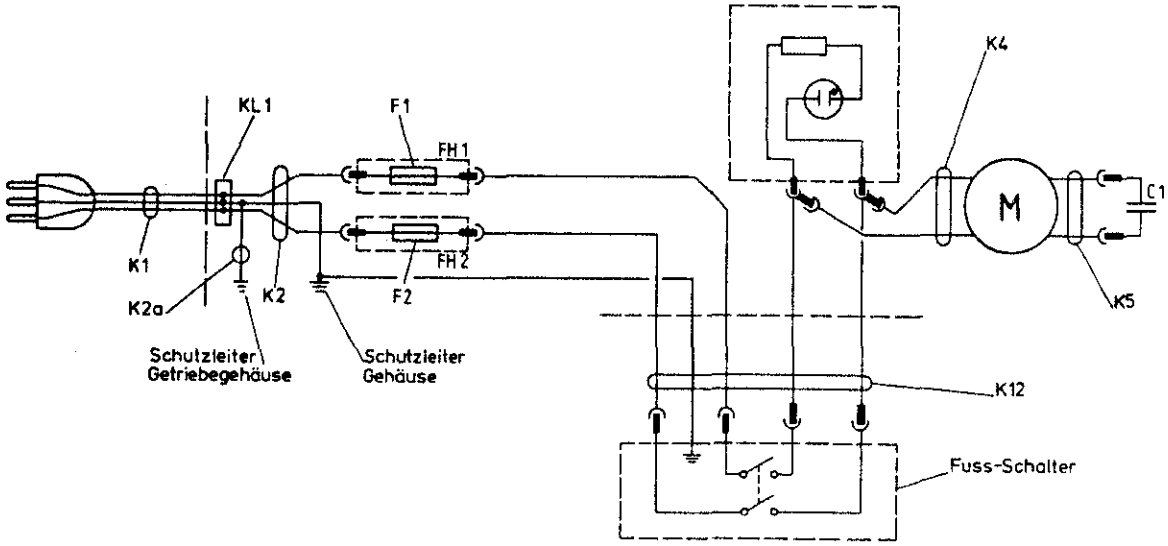
C. Without electronics, with connector for foot switch



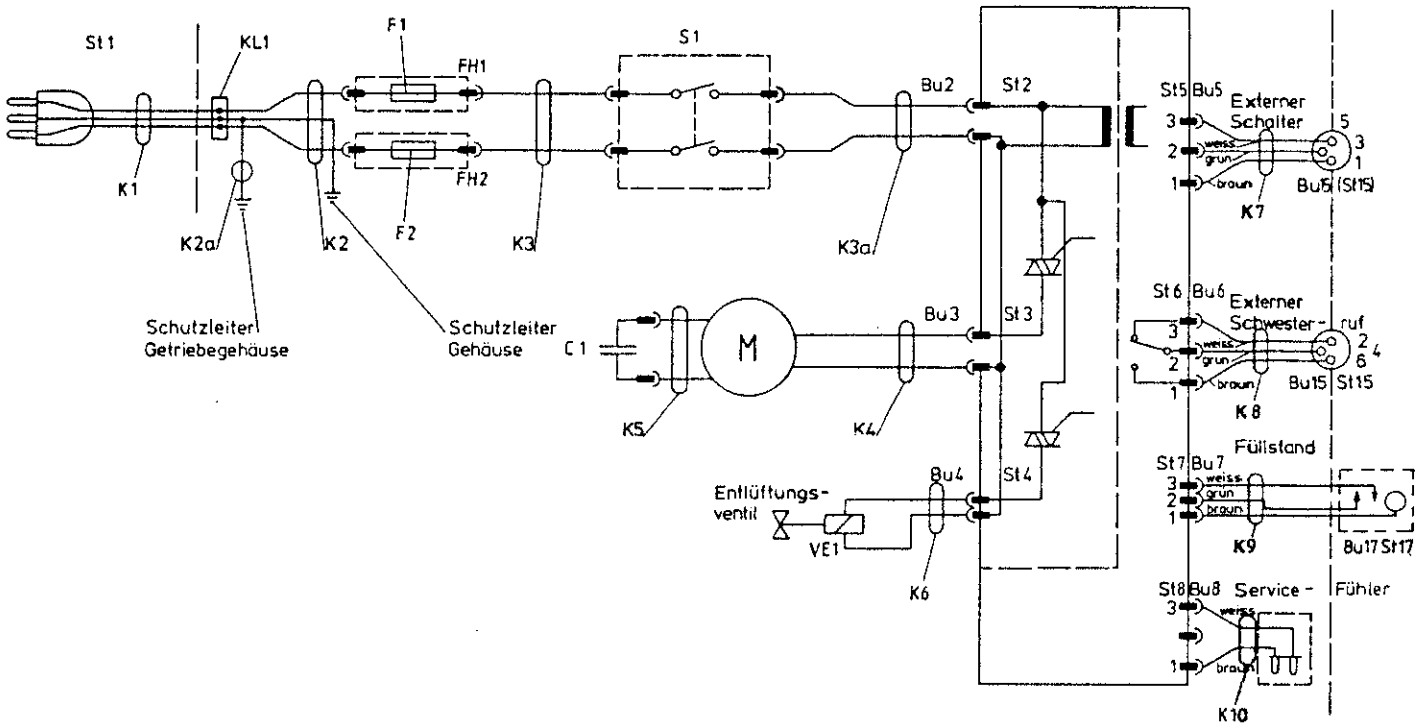
D. Without electronics, AP
(anaesthetic-proof)



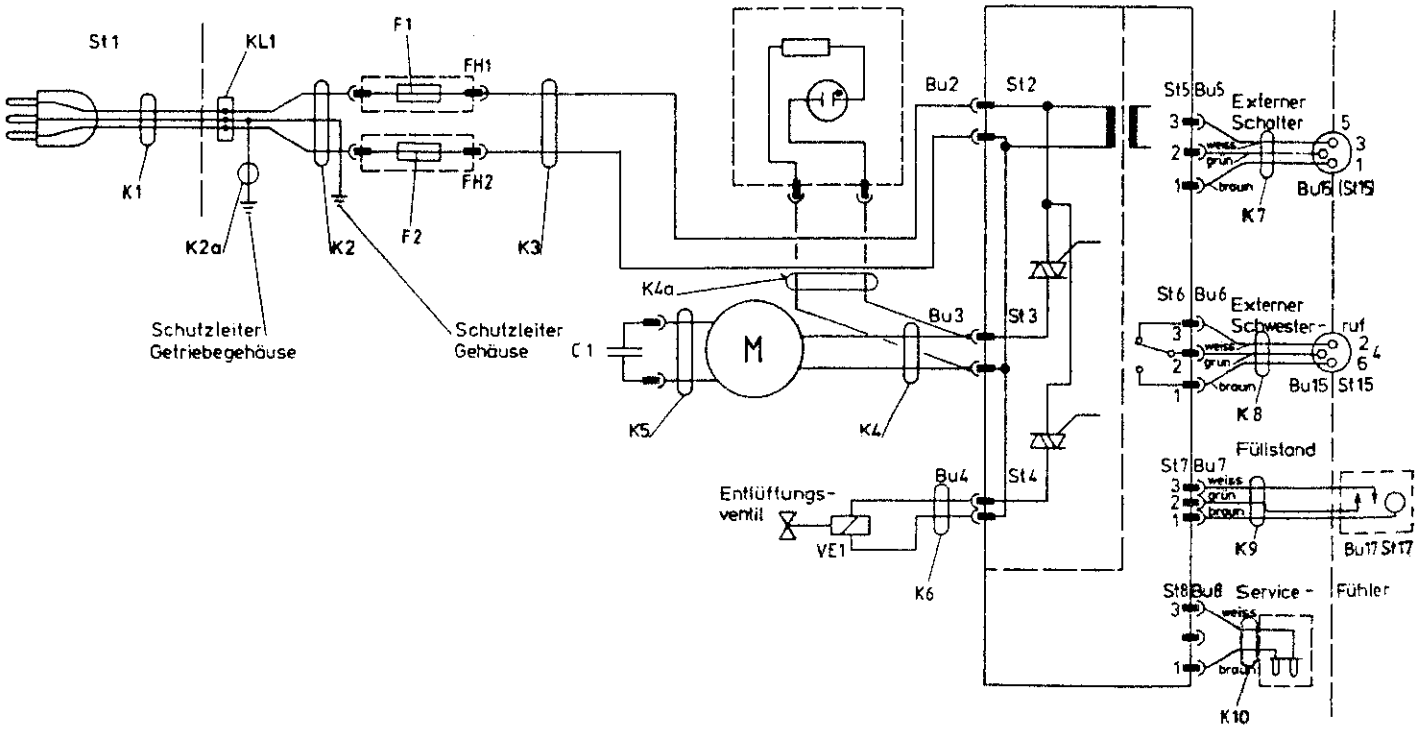
E. Without electronics, AP
with foot switch



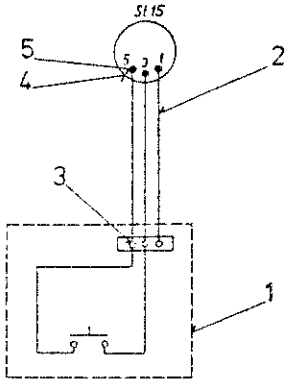
F. With electronics



G. With electronics, AP



H. Foot Switch for pumps with electronics



5. Troubleshooting

Problem	Possible source of trouble	Check/action to be taken
Motor will not run	Mains switch	Set at "ON"
	Power supply	Voltage, power socket
	Electrical cord	Plug type, plug connections, damaged cord
	Fuses	Type, condition
	Drive unit jammed	Summon technician, or repair service
	Electronic fault	See page 12/13
Inadequate suction performance	Leak within the pump or in the external suction circuit	Isolate the source of trouble by carrying out the checks outlined in Section 6.
	External cause:	
	Push-in connector O-rings	Condition
	Safety bottle O-rings	Condition
	Air filter O-rings	Condition
	Push-in connectors	No leaks at tube ends Push in as far as stop
	Tubing	Cracks, brittle areas
	Lids	Airtight fit to bottle
	Bottles	Condition, possible cracked edges, hairline cracks
	Bacteria filter housing	Condition, absence of leaks
	Filter paper	Condition, position of housing
	Internal cause:	
	Tubing or mechanical components	Summon technician or repair service
Vacuum gauge indicates a vacuum Pump does not suck, however	Blockage or kink in tubing within the pump or in the external suction circuit	Isolate source of trouble as follows: Remove the safety bottle from the pump; leave the suction connection open.
		If the vacuum gauge now indicates zero vacuum = the cause is external
	External cause:	
	Bacteria filter Safety bottle Overflow valve in the lid, (float valve) push-in connectors, tubing, etc.	Investigate the whole external suction circuit for blockage(s), float valve sticking, kinked tubing and rectify.
		If the vacuum gauge still indicates a vacuum = the cause is internal
	Internal cause:	
	Tubing or mechanical components	Summon technician or repair service

6. Maintenance procedures

The pump must be given a routine service at intervals of approximately 1,000 operating hours or at least once every year.

To ensure troublefree operation, repairs to the pump may only be carried out by an agent authorized by Medela. This also includes cylinder cleaning as well as belt changing.

Servicing

The following figures refer to the drawings and the spare parts' list at the end of this manual.

General:
Disconnect the electrical cord (7) from the mains supply.
Release the eight screws (14) and remove the pump housing (2).
Check the toothed belt (26) after removing the cover plate (43). Also check the flat belt (17). Wipe all surfaces free of dust resulting from wear and tear on the belt. If the belt indicates excessive signs of wear, it must be replaced according to the special instructions.
Check the sound absorber (80) and remove any dirt if necessary.
Ensure that all tubing connections are clean, both inside and outside, and check for discoloration, cracks or defective connectors. Replace if necessary.
All pieces of tubing should be of adequate length and routed so as to prevent them from jamming or kinking anywhere.
All tubing ends must extend over the full length of the connector ferrule as far as the stop, and must be free from cracks. By pulling on them gently, check that all pieces of tubing are routed freely without any kinks.

It is vital when replacing a piece of tubing:
that only genuine Medela tubing is used for internal connections, and that the ends are pushed well onto the ferrules as far as the stop. It is important to ensure that the pieces of tubing (61,66) which come from the pump cylinders (3,10) are free to move without any kinks when the motor (28) is running.

Valve block:
Undo the knurled nuts (4) and remove the valve assembly (62-65). Only remove the tubing if the inspection measures described above indicate that replacements or cleaning are required. Clean off all parts of the valves with compressed air. Wash off any stubborn dirt with cold water and dry all items prior to reassembly. Replace any damaged rubber seals (63). Prior to reassembly, dust all used and new rubber components lightly with talc.

Please note:
If the sound absorber (80) and the tubing are contaminated, it must be assumed that the valves (62 - 65) and the pump cylinder(s) (3/10) require cleaning. Please take note of the section on "Piston/cylinders"! If the pieces of tubing (53, 57, 75) to the vacuum regulator (73/74) are dirty, the latter must be dismantled and cleaned according to the detail drawing.

Electrical connections:
Ensure that all screw- and push-on connections are not loose.
Make certain that all wiring insulation is intact and free from damage.
In the case of AP models (non-electronic), check that the seals on the power switch housing are not damaged, i.e. in perfect condition.
Check fuses (86).

Piston/cylinder unit: dismantling and cleaning

Remove the screw (49) together with spacers (46 - 48). Slacken screw (106). The cylinders (3,10) can be removed by gentle pressure applied simultaneously to the cylinder end covers (91,92) and the cranks (105). The lower cylinder cover (104) can now be removed after the screws (93) have been released. It is not usually necessary to carry out any further dismantling operations.

Dirt and deposits can be removed with lukewarm water (do not use any cleaning agents!). The ball bearing in the integral piston rod/big end unit (105) is sealed for life and must on no account come into contact with any cleaning agents.
Black discolorations on the cylinder wall (96) or on the piston rod (105) are a sign of satisfactory lubrication and should not be removed. The presence of black powder is the result of extremely small, but sharp ridges on the rubbing surfaces. Using emery cloth, the corresponding areas should be very carefully polished in the direction of piston travel.

Warning: The cylinder wall and the piston rod have been very carefully surface-treated and must be handled accordingly.

Piston/cylinder unit: reassembly

Warning: No lubricants may be used in the course of the following operations!

Reassemble the cylinders (3,10) in the reverse order to that described above. When cold, it must be possible to slide the piston rods (105) up and down with a force of between 6 - 10 kg. The cylinders must be refitted with great care to ensure that the fine coating on the sleeve bearings is not damaged! Ensure that the two cranks are offset by 90°.

Replacement of flat- and toothed belts

If, during servicing, excessive wear and tear (fine rubber particles) are discovered and/or the inner belt face shows clear signs of wear, the belt in question must be replaced.

Flat belt:
Rotate the flat belt pulley (16) by hand and withdraw the belt (17) sideways. Fit a new belt using the same method. The belt should centre itself when the motor is running, i.e. it must not run over the edge of the drive shaft. If it does not do so, adjust the position of the motor via the screws (12). If the belt centres itself during running, belt tension is automatically correct.

Toothed belt:
To change the toothed belt (26), first remove the cylinder (3). (Refer to the instructions above.) Then unscrew (40) the bearing cover (41). Remove the flange ring (38) via the screws (39) and change the toothed belt (26). Belt tension is determined by the distance and position of the toothed pulleys and cannot be altered.
The drive mechanism is reassembled in the reverse order. Please pay careful attention to the above instructions on cylinder/piston reassembly.

Service call indicator

A. Models without a liquid crystal display:

The alarm indicates that moisture has gained access to the suction unit (bottles not emptied/mechanical overflow valve disassembled).

- Return the pump to the technical department or a Medela service agent for dismantling and cleaning. The work to be done is described on pages 10/11.

- The internal liquid sensor (see item 121 / pages 14/19) must also be cleaned and dried, otherwise the same service alarm will be triggered off again.

- The fuse on the back of the circuit board must be replaced. This will also cancel the visual service alarm.

B. Models with a liquid crystal display: (see illustration p. 13)

Several reasons for this alarm are possible. The cause can be traced with the aid of the integral diagnostic program (*).

- Press keys (7) and (2) on the low vacuum pump resp. (1) and (3) on the vacuum extractor simultaneously. An "S" for "Service" will now appear on the display. When released, a symbolic "G" (reason for the alarm) will appear, together with a number with the following meaning:

  0 = No service required (as there is no alarm condition)
  1 = The battery on the PCB (for memory and timer) must be changed
  4 = Moisture has gained access to the suction unit, e.g. (bottles not emptied/mechanical overflow valve disassembled).

  - Return the pump to the technical department or a Medela service agent for desmantling and cleaning. The work to be done is described on pages 10/11.

  - The internal liquid sensor (see item 121 / pages 14/19) must also be cleaned and dried, otherwise the same service alarm will be triggered off again.

  - For resetting the electronics, switch on the pump (K) and briefly short-circuit connections 39 and 54 on the circuit board. This resetting operation is acknowledged by means of an acoustic signal and the electronic system is now ready for operation again.

* Note:
During the diagnostic phase, the "Start/Stop" key cannot be used. Return to normal operation is effected by pressing key 7 (low vacuum pump) resp. key 1 (vacuum extractor) three times.

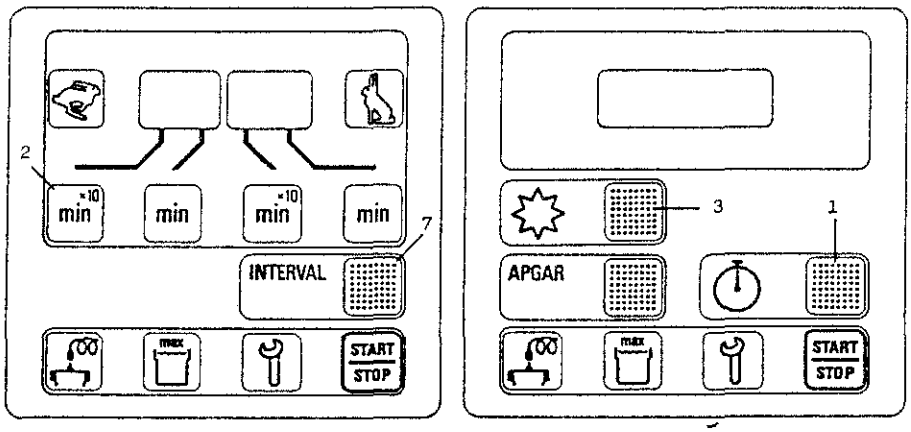
Correcting an electrical fault

A. The "Start/stop" key does not funtion:

- Check fuses (L). The main switch (K) must be set to "ON".

- Probably, keys (7) and (2) on the low vacuum pump resp. (1) and (3) on the vacuum extractor were pressed simultaneously by mistake. This programs the electronics to a help setting for servicing purposes and eliminates normal control functions.

  Press the key (7) resp. key (1) three times. The pump can now be controlled again using the "Start/stop" key.



B. Electronics indicate other malfunctions:

- It is possible that the programming has been affected by a voltage peak in the mains supply.

- Connect the unit to the mains supply. Set switch (K) set to "ON"

- Briefly short-circuit PCB-connections 39 and 54. This resetting operation is acknowledged by means of an acoustic signal.

- If the electronic system does not return to normal operation even after this has been done, the circuit board must be replaced. Prior to restarting, the resetting operation described above must also be carried out first (shorting PCB- connections 39/54).